

Presence of juvenile *Diplodus sargus* (Sparidae) on the seashore of North Brittany (France)

by

Bruno CHANET (1) & Agnès DETTAÏ (2)

RÉSUMÉ. - Présence de juvéniles de *Diplodus sargus* sur le littoral de la Bretagne nord (France).

Des juvéniles de sars communs, *Diplodus sargus* (Linnaeus, 1758), ont été observés et échantillonnés sur le littoral rocheux le plus occidental de la Bretagne nord. Cette présence montre que cette espèce a colonisé et s'est établie bien au nord de sa répartition connue. L'analyse des séquences ADN pour la sous-unité 1 de la cytochrome oxydase (COXI) a confirmé l'identification spécifique.

Key words. - Sparidae - *Diplodus sargus* - ANE - North Brittany - Barcoding - Distribution.

The white seabream *Diplodus sargus*, (Linnaeus, 1758) is a well-known sparid species on the coasts of the Eastern Atlantic, from Bay of Biscay to South Africa. On the French Atlantic seashore, Quérou and Guéguen (1978) indicate that this species is not frequent and is absent in the northern part (higher than 46°50' N) of the Bay of Biscay; white seabream also occurs in the Mediterranean and Black Sea (Bauchot and Hureau, 1986; Bauchot, 1987). This species has been divided in two subspecies *D. sargus sargus* and *D. sargus cadenati* (De la Paz *et al.*, 1974: 113). Eschmeyer (1998) recognised only one valid species: *Diplodus sargus* (Linnaeus, 1758). A related species, *Diplodus vulgaris* (Geoffroy Saint-Hilaire, 1817) has been observed in the southern part of the English Channel (Craignou and Gentil, 1992). Juvenile white seabream inhabit coastal rocky reef areas (Ranzi, 1933), especially in ponds (Quignard and Man-Wai, 1983). From August to October 2007, juveniles of *Diplodus sargus* (Fig. 1) were observed in pools at low tide and under rocks at high tides by 1.5-2 m deep on the rocky seashore of the "Grève bleue", a strand located on the most western part of French North Brittany (48°23'N-4°52'W), near Le Conquet (Fig. 1). Specimens (Fig. 2) were caught with a shrimp net and were identified as *D. sargus* by the absence of a cephalic black mark and the fine dark dorso-ventral stripes (Quérou and Guéguen, 1978). Nearly a hundred specimens were observed several times in the different pools of the area, swimming fast between seaweeds. According to growth graphs obtained by Quignard and Man-Wai (1983), individuals appear to be a few months old and may come from a spawning in April 2007 (Bauchot and Hureau, 1986).

Two specimens preserved in ethanol have been deposited in the collection of the MNHN (MNHN-ICTI 1601 and MNHN-ICTI 1602). Flesh samples were extracted and amplified in the same way as in Dettai and Lecointre (2005). Oligonucleotidic primers for amplification and sequencing of COX1 are Fish-F1 and Fish-R1 (Ward *et al.*, 2005). The sequences were obtained for both strands (Genoscreen, France), and checked by eye using BioEdit (Hall, 1999). They were deposited in GenBank (accession numbers:

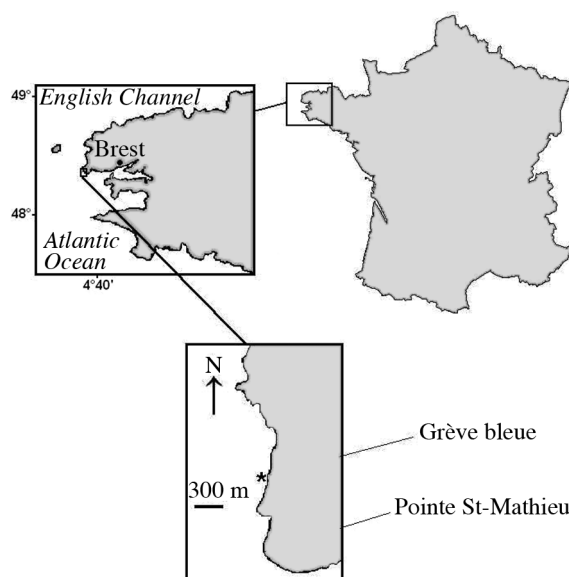


Figure 1. - Map showing the capture site of juveniles of *Diplodus sargus* in north Brittany (Aug. 2007). [Localisation du lieu de capture de juvéniles de *D. sargus* en Bretagne nord.]

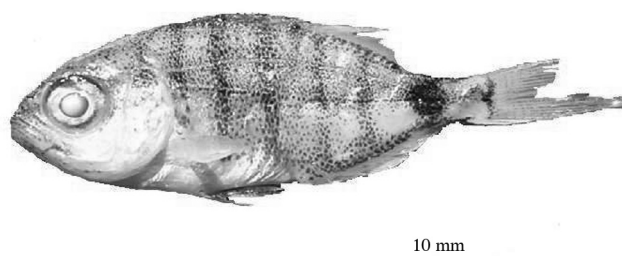


Figure 2. - Juvenile of *Diplodus sargus* caught on the North Breton Atlantic seashore (Aug. 2007) (MNHN-ICTI 1601). [Juvénile de *D. sargus* capturé sur le littoral atlantique en Bretagne nord.]

EU239692 and EU239693) and Barcoding of Life (BOL) database. They have been compared with available sequences in BOL (www.barcodingoflife.org) database; the search ("full database search" setting) found nine other *D. sargus* sequences as closest, with a similarity between 99.85 and 98.27%. In the tree-based identification, our sequences were embedded in a *D. sargus* clade, corroborating the identification. A sequence of *Dactylopterus volitans*,

(1) MNHN, USM 603, CP 26, Département de Systématique et Évolution, 57 rue Cuvier 75005 Paris, FRANCE. [Bruno.Chanet@ac-rennes.fr]

(2) MNHN, UMR 7138, Département de Systématique et Evolution, 57 rue Cuvier, 75231 Paris CEDEX 05, FRANCE. [adettai@mnhn.fr]

Table I. - Morphometric and meristic characteristics of juvenile of *Diplodus sargus* (MNHN-ICTI 1601). [*Caractères morphométriques et méristiques des juvéniles de D. sargus.*]

	MNHN-ICTI 1601
Biometrics (mm)	
Total length	23.0
Standard length	19.0
Predorsal length	7.3
Preal anal length	11.5
Head length	6.3
Eye diameter (horizontal)	3.0
Snout length	1.2
Upper jaw length	3.3
Pectoral fin length	3.5
Body depth (maximum)	6.8
Meristics	
Dorsal fin rays	XI-14
Anal fin rays	III-13

probably resulting from a contamination, was also included in the clade. No *D. vulgaris* sequences are available at this time in BOL database, so we could not evaluate directly whether the divergence between the COXI sequences of *D. sargus* and *D. vulgaris* could be small enough to lead to a molecular misidentification. No COXI sequence for either species was found in GenBank, but several sequences including links to voucher specimens were available for two other markers, the mitochondrial cytochrome b (EF439200, EF439201, DQ197946, EU036435, EU036436, EF427554, EF427555, EF439522, EF439523 and EF439525, EF439524, EF427557, EF427556, EU036438, EU036437, EF439203, EF439202) and the nuclear rhodopsin retrogene (EU036544, EU036543, EF439373, EF439372, EF439275, EF439274, EF439106, EF439105 and EU036546, EU036545, EF439375, EF439374, EF439277, EF439276, EF439108, EF439107, EF427474, EF427473). Unpublished molecular data obtained by the second author on other acanthomorph fish species (Eleotridae, Notothenioidei) shows that the divergence between cytochrome b sequences is higher than between COXI sequences in all tested species, while the rhodopsin retrogene sequences are less divergent. The available sequences were downloaded, aligned and the divergence between the species was calculated with DNADIST 3.5 as included in BioEdit (Hall, 1999). The divergence between specimens of the two species for retro-rhodopsin ranges from 5.91% to 6.64%, and for the cytochrome b the divergence is above 11% for all specimen pairs. If the divergence rate of COXI for *Diplodus* is comprised between the divergence rates for these two markers, the level of divergence observed here is well above the Barcode threshold value of 2%, and would not allow confusion between these species using molecular identification.

Adults of several species of the genus *Diplodus* can be occasionally observed in North Brittany during summer for *Diplodus vulgaris* (Craignou and Gentil, 1992) and for *Diplodus sargus* (Chanet, pers. obs.) at the same location during summers 2005 and 2006). But adult white seabreams are known to occur in the Mediterranean Sea and on the Atlantic seashore up to the Gulf of Biscaye in the north. Quignard and Man-Wai (1983) indicated that reproduction for these species only takes place in the Mediterranean Sea.

The presence of juvenile white seabreams on the Atlantic seashore as high as 48°23'N documents the northward extension of the geographical distribution of this species, and the settlement of this species on the seashore of north Brittany. The presence of *D. sargus* juveniles in North Brittany, if repeated in following years, might be a biological consequence of the global warming.

Acknowledgements. - We thank Tiphaine Chanet (Brest, France) for her help in the capture of the specimens, and Jean-Claude Quéro (MNHRL, La Rochelle) and François Meunier (MNHN, Paris) for advice.

REFERENCES

- BAUCHOT M.-L., 1987. - Poissons osseux. In: Fiches FAO d'Identification pour les Besoins de la Pêche. (rev. 1). Méditerranée et Mer Noire. Zone de Pêche 37, Vol. 2 (Fischer W., Bauchot M.-L. & M. Schneider, eds), pp. 891-1421. Rome: Commission des Communautés européennes & FAO.
- BAUCHOT M.-L. & J.-C. HUREAU, 1986. - Sparidae. In: Fishes of the North-Eastern Atlantic and the Mediterranean, Vol. 2 (Whitehead P.J.P., Bauchot M.-L., Hureau J.-C., Nielsen J. & E. Tortonese, eds), pp. 883-907. Paris: UNESCO.
- CRAIGNOU Y. & F. GENTIL, 1992. - Note sur *Diplodus vulgaris* (Geoffroy Saint-Hilaire), nouvelle espèce de poisson pour la faune marine de Roscoff. *Cah. Biol. Mar.*, 33(4): 519-520.
- DETTAÏ A. & G. LECOINTRE, 2005. - Further support for the clades obtained by multiple molecular phylogenies in the acanthomorph bush. *C. R. Acad. Sci., Biol.*, 328: 674-689.
- ESCHMEYER W.N., 1998. - Catalog of Fishes. 3 vols, 2905 p. San Francisco: California Academy of Sciences.
- HALL T.A., 1999. - BioEdit: A user-friendly biological sequence alignment editor and analysis program for Windows 95/98/NT. *Nucleic Acids Res. Symp. Ser.*, 41: 95-98.
- DE LA PAZ R., BAUCHOT M.-L. & J. DAGET, 1974. - *Diplodus* (Perciformes, Sparidae) du groupe *Sargus* : Systématique et phylogénie. *Ichthyologia*, 5(1): 113-128.
- QUÉRO J.-C. & J. GUÉGUEN, 1978. - Données sur la faune ichthyologique du golfe de Gascogne. 1. Répartition des *Diplodus* (Sparidae, Perciformes) et remarques sur leurs stades juvéniles. *Cybium*, 3: 82-94.
- QUIGNARD J.-P. & R. MAN-WAI, 1983. - Relations taille-poids et coefficient de condition de *Diplodus sargus* 0+ et 0++ de deux étangs palavasiens: Prévost et Mauguio. *Cybium*, 7: 31-41.
- RANZI S., 1933. - Uova, larve e stadi giovanili dei teleostei, Sparidae, fauna e flora di golfo di Napoli. *Monografia*, 38: 332-338.
- WARD R.D., ZEMLAK T.S., INNES B.S., LAST P.R. & P.D.N. HEBERT, 2005. - DNA barcoding Australia's fish species. *Phil. Trans. R. Soc. Lond., B.*, 360: 1847-1857.

Reçu le 25 octobre 2007.

Accepté pour publication le 18 décembre 2007.